

# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

## Volume 5 | Technical Appendices

CFA2 | Camden Town and HS1 Link  
**Data appendix (AQ-001-002)**  
Air quality

November 2013

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Department  
for Transport

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# 1 Introduction

1.1.1 The air quality appendix for the Camden Town and HS1 Link community forum area (CFA2) comprises:

- discussion of the policy framework (Section 2);
- baseline air quality data (Section 3);
- dust impact evaluation and risk rating (Section 4); and
- air quality assessment - road traffic (Section 5).

1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5, Air Quality Map Book.

## 2 Policy framework

- 2.1.1 The London Plan<sup>1</sup> forms the Regional Spatial Strategy for Greater London and integrates economic, environmental, transport and social frameworks. Specifically for air quality, it seeks to achieve reductions in pollutant emissions and minimise public exposure to pollution. Policy 7.14 of the London Plan sets out a number of objectives such as minimising increased exposure to existing poor air quality, the need to reduce emissions from demolition and construction activities using best practice and the provision of on-site mitigation measures during development.
- 2.1.2 The Mayor's Air Quality Strategy<sup>2</sup> and Supplementary Planning Guidance (SPG) on Sustainable Design and Construction<sup>3</sup> set out actions for improving London's air quality and include measures aimed at reducing emissions from transport and new developments. A key objective of the Strategy is to make better use of the planning process so that new developments do not contribute to air pollution. Policy 3 also gives support to the expansion of competitive rail-based alternatives to aviation, including the development of a national high speed rail network.
- 2.1.3 At the local level the planning authority in the Camden area has policies that seek to limit pollution levels, improve air quality and reduce emissions from development.
- 2.1.4 The London Borough of Camden (LBC) Core Strategy<sup>4</sup> Policy CS16 seeks to improve health and well-being, recognising the impact of poor air quality on health. The policy refers to the implementation of Camden's Air Quality Action Plan<sup>5</sup> (AQAP) which aims to reduce air pollution levels.
- 2.1.5 Local and regional guidance relevant to the consideration of climate change adaptation and air quality is provided in the draft Climate Change Adaption Strategy for London<sup>6</sup>.

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<sup>1</sup> Greater London Authority (GLA) (2011), *The London Plan: Spatial Development Strategy for Greater London*, GLA, London.

<sup>2</sup> Greater London Authority (GLA) (2010) *Clearing the Air: The Mayor's Air Quality Strategy*, GLA, London.

<sup>3</sup> Greater London Authority (GLA) (2006) *Sustainable Design and Construction: The London Plan Supplementary Planning Guidance*, GLA, London.

<sup>4</sup> London Borough of Camden (2010) *Core Strategy*

<sup>5</sup> London Borough of Camden (2013) *Air Quality Action Plan 2013-2015* (draft for consultation)

<sup>6</sup> Greater London Authority (GLA), (2010), *Draft Climate Change Adaptation Strategy for London*, GLA, London

## 3 Baseline air quality data

### 3.1 Existing air quality

#### Local authority review and assessment information

3.1.1 LBC has a designated air quality management area (AQMA) covering its entire administrative area.

3.1.2 LBC has an AQAP in place aimed at improving air quality.

#### Local air quality monitoring data

3.1.3 Monitoring sites within the study area that are considered relevant for this assessment are shown in Map AQ-01-002 (Volume 5, Air Quality Map Book). The following sections provide a summary of the recorded pollutant concentrations at these sites.

3.1.4 The pollutant concentrations can be compared to the air quality standards:

- $40\mu\text{g}/\text{m}^3$  as an annual mean for  $\text{NO}_2$  and  $\text{PM}_{10}$ ;
- $200\mu\text{g}/\text{m}^3$  one-hour mean for  $\text{NO}_2$  not to be exceeded more than 18 times a year (equivalent to the 99.8<sup>th</sup> percentile of the one-hour mean);
- $50\mu\text{g}/\text{m}^3$  24-hour mean for  $\text{PM}_{10}$  not to be exceeded more than 35 times a year (equivalent to the 90.4<sup>th</sup> percentile of the 24-hour mean); and
- $25\mu\text{g}/\text{m}^3$  as an annual mean for  $\text{PM}_{2.5}$ .

#### Continuous monitoring

3.1.5 This section summarises the results from the continuous monitoring sites that are considered relevant for the assessment of air quality in this study area.

Table 1: Annual mean pollutant concentrations recorded at continuous monitoring sites<sup>7</sup>

Pollutant	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )				
	2008	2009	2010	2011	2012
<b>LBC - Bloomsbury (Ordnance Survey co-ordinates 530123, 182014)</b>					
$\text{NO}_2$	55.2	54.2	55.2	49.9	55.1
$\text{PM}_{10}$	23.2	22.8	17.9	22.5	18.7
$\text{PM}_{2.5}$	17.0	16.3	16.1	17.4	16.2
<b>LBC - Shaftesbury Avenue (530057, 181285)</b>					
$\text{NO}_2$	80	88	89	76	71
$\text{PM}_{10}$	30	30	30	31	29
<b>LBC - Swiss Cottage (526629, 184391)</b>					
$\text{NO}_2$	75	84	82	71	70
$\text{PM}_{10}$	27	25	26	27	23

<sup>7</sup> Kings College London, [www.londonair.org.uk](http://www.londonair.org.uk), Accessed: May 2013



Pollutant	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )				
	2008	2009	2010	2011	2012
PM <sub>2.5</sub>	No data <sup>8</sup>	17	17	16	13
<b>LBC - Euston Road (529884, 182639)</b>					
NO <sub>2</sub>	No data	No data	No data <sup>9</sup>	123	106

Table 2: Number of hours when hourly mean NO<sub>2</sub> concentrations exceed  $200\mu\text{g}/\text{m}^3$  at continuous monitoring sites<sup>10,11</sup>

Site	Number of exceedances of hourly mean NO <sub>2</sub> standard				
	2008	2009	2010	2011	2012
LBC - Bloomsbury (530123, 182014)	0 (138)	2 (122)	1 (125)	0 (134)	1 (133)
LBC - Shaftesbury Avenue (530057, 181285)	8 (190)	10 (191)	21 (207)	15 (198)	12 (191)
LBC - Swiss Cottage (526629, 184391)	68 (224)	215 (303)	126 (265)	76 (247)	41 (6)
LBC - Euston Road (529884, 182639)	No data	No data	No data	703 (309)	293 (260)

Table 3: Number of days when daily mean PM<sub>10</sub> concentrations exceed  $50\mu\text{g}/\text{m}^3$  at continuous monitoring sites<sup>11,12</sup>

Site	Number of exceedances of daily mean PM <sub>10</sub> standard				
	2008	2009	2010	2011	2012
LBC - Bloomsbury (530123, 182014)	13 (41)	13 (42)	2 (28)	17 (38)	10 (32)
LBC - Shaftesbury Avenue (530057, 181285)	20 (44)	13 (43)	4 (42)	27 (47)	17 (45)
LBC - Swiss Cottage (526629, 184391)	19 (45)	11 (44)	10 (40)	31 (49)	20 (42)

## Diffusion tubes

3.1.6 This section summarises the results from the diffusion tube sites that are considered relevant for the assessment of air quality in this study area.

Table 4: Annual mean NO<sub>2</sub> concentrations recorded at diffusion tube monitoring sites<sup>13,14,15</sup>

Site	Ordnance Survey coordinates	Annual mean NO <sub>2</sub> concentrations ( $\mu\text{g}/\text{m}^3$ )				
		2008	2009	2010	2011	2012
High Road Willesden	532031, 184655	73	65	54	60	68
La Sainte School	528588, 186249	36	36	35	No data <sup>16</sup>	No data <sup>16</sup>
Kentish Town Road	529013, 185102	62	68	74	57	59

<sup>8</sup> PM<sub>2.5</sub> not monitored in 2008<sup>9</sup> Site opened 2010<sup>10</sup> 99.8<sup>th</sup> percentile of hourly mean NO<sub>2</sub> concentrations in brackets ( $\mu\text{g}/\text{m}^3$ )<sup>11</sup> Kings College London, [www.londonair.org.uk](http://www.londonair.org.uk), Accessed: May 2013<sup>12</sup> 90.4<sup>th</sup> percentile of daily mean PM<sub>10</sub> concentrations in brackets ( $\mu\text{g}/\text{m}^3$ )<sup>13</sup> London Borough of Camden (2012) *Air Quality Updating and Screening Assessment*<sup>14</sup> London Borough of Brent (2011) *Air Quality Progress Report*<sup>15</sup> London Borough of Brent (2012) *Air Quality Updating and Screening Assessment*<sup>16</sup> Data not available in local authority reports.

Site	Ordnance Survey coordinates	Annual mean NO <sub>2</sub> concentrations (µg/m <sup>3</sup> )				
		2008	2009	2010	2011	2012
Gloucester Avenue	528672, 183642	57	62	63	No data	No data
Inverness Street	528815, 183909	42	46	55	No data	No data
Camden Road	529173, 184129	67	73	84	72	67

### Greater London Authority maps

- 3.1.7 Greater London Authority (GLA)<sup>17</sup> maps of modelled pollution concentrations provide further context on the spatial pattern of air pollution across London and indications of likely pollutant concentrations across the capital. Modelling is less robust, however, than monitoring data and may not fully take into account local characteristics that influence pollution levels.
- 3.1.8 GLA pollution maps estimate that annual NO<sub>2</sub> concentrations exceed air quality standards at or near main roads within the Camden area. The maps show no significant change in NO<sub>2</sub> concentrations from 2008 to 2011.
- 3.1.9 Annual mean PM<sub>10</sub> concentrations have reduced marginally at all locations between 2008 and 2011 according to the GLA modelling estimates, although not along main roads such as Euston Road and Finchley Road, which in 2011 were still above the air quality standard. The number of days on which the PM<sub>10</sub> concentrations exceed the standard of 40µg/m<sup>3</sup> is estimated to have fallen between 2008 and 2011, although the frequency of exceedances is higher near busy roads.
- 3.1.10 PM<sub>2.5</sub> exceedances across the boroughs are estimated to have decreased between 2008 and 2011 and are confined to locations along busy roads.

### Background pollutant concentrations

- 3.1.11 Estimates of background air quality were obtained from the Department for Environment, Food and Rural Affairs (Defra) maps<sup>18</sup>. Background NO<sub>2</sub> concentrations are close to or above air quality standards throughout the study area. Background PM<sub>10</sub> levels are below air quality standards throughout the study area. NO<sub>2</sub> annual mean concentrations were in the range 22.2µg/m<sup>3</sup> - 55.0µg/m<sup>3</sup> in 2012. PM<sub>10</sub> annual mean concentrations were in the range 17.2µg/m<sup>3</sup> - 23.9µg/m<sup>3</sup> in 2012.
- 3.1.12 Defra background concentrations for the relevant assessment years were used in the Design Manual for Roads and Bridges (DMRB)<sup>19</sup> and ADMS-Roads assessments.

### Local emission sources

- 3.1.13 The main source of pollution within the study area is road vehicles. Major roads include York Way, Camden Road, Kentish Town Road and Chalk Farm Road. Other

<sup>17</sup> Greater London Authority (GLA) (2010) *London Atmospheric Emissions Inventory 2008 Concentration Maps*; <http://data.london.gov.uk/laei-2008-concentration-maps>; Accessed: May 2013.

<sup>18</sup> Department for Environment, Food and Rural Affairs (Defra) (2012) *Defra background maps 2010*; <http://laqm.defra.gov.uk/maps/maps2010.html>; Accessed: July 2013.

<sup>19</sup> Highways Agency, (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*

emission sources in Camden include two permitted Part A<sup>20, 21</sup> processes, comprising a waste transfer facility at Hornsey Street and a Combined Heat and Power facility at Charterhouse Street<sup>22</sup>. Due to the distance of Part A processes from the Proposed Scheme and the nature of their emissions, it is unlikely that these will have an effect on local air quality in the study area. Contributions to local pollutant concentrations made by these industrial installations are included within background concentrations used in this assessment.

## 3.2 Receptors

### Human

#### *Construction phase*

- 3.2.1 There are many potential receptors in the Camden area, given its urban nature and the proximity of many residential properties, commercial businesses and community facilities to construction sites and roads where traffic flows could change. Receptors at greatest risk of dust effects are indicated in Map AQ-02-002-01 and Map AQ-02-002-02 (Volume 5, Air Quality Map Book).

#### *Operational phase*

- 3.2.2 There are many receptors in the study area and high densities of residential properties. Several sensitive receptors identified along the route include a nursery, Agar Children's Centre, and schools including Hawley Infant and Nursery School, Holy Trinity Primary School, Frank Barnes School for Deaf Children and The Cavendish School.

### Ecological

#### *Construction phase*

- 3.2.3 The North London Line Site of Biological Importance (SBI), Copenhagen Junction SBI and London Canals Site of Metropolitan Importance (SMI) are close to areas of proposed construction activity and are sensitive to dust deposition. Camley Street Local Nature Reserve (LNR) and other ecological sites in the study area with similar designations are too far from construction activity to be affected.

#### *Operational phase*

- 3.2.4 No ecological receptors in the Camden area are considered likely to be affected by air quality as a result of the operational phase.

<sup>20</sup> Pollution Prevention and Control Act 1999 London, Her Majesty's Stationery Office

<sup>21</sup> The Environmental Permitting (England and Wales) Regulations 2010, London, Her Majesty's Stationery Office

<sup>22</sup> Environment Agency, *What's in your Backyard?*; <http://www.environment-agency.gov.uk/wiyby/>; Accessed: August 2013.

## 4 Dust impact evaluation and risk rating

4.1.1 The following sections provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance<sup>23</sup>. A specific figure is provided where considered useful to identify receptors and their relationship to the construction activity.

Table 5: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft Code of Construction Practice <sup>24</sup> mitigation measures)	Principal justifications
<b>Euston Station tunnel portal (Map AQ-02-002-01 Figure 2.1 (Volume 5, Air Quality Map Book))</b>						
Demolition	Less than 20m	Medium	Medium	Medium	Negligible	1. Less than 20,000m <sup>3</sup> waste generated during demolition Material with a high dust potential (concrete)  2. Fewer than 10 receptors within 20m of the site
Earthworks	N/A	N/A	N/A	N/A	N/A	No earthworks on site
Construction	Less than 20m	Medium	Medium	Medium	Negligible	1. On-site concrete batching, piling, use of dusty construction materials.  Assumed less than 100,000m <sup>3</sup> building material volume at Euston approach  2. Fewer than 10 receptors within 20m of the site

<sup>23</sup> Institute of Air Quality Management (IAQM), (2011), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*

<sup>24</sup> Volume 5: Appendix CT-003-000

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft Code of Construction Practice <sup>24</sup> mitigation measures)	Principal justifications
Trackout	N/A	N/A	N/A	N/A	N/A	No trackout near to the Camden Town and HS1 Link area boundary
<b>Camley Street main worksite (Map AQ-02-002-01 Figure 2.3 (Volume 5, Air Quality Map Book))</b>						
Demolition	20-100m	Small	Low	Medium	Negligible	<p>1. Building volume assumed to be less than 20,000m<sup>3</sup></p> <p>Waste demolition material mainly metal cladding, low potential for dust release</p> <p>2. Fewer than 10 receptors within 20m of the site</p>
Earthworks	N/A	N/A	N/A	N/A	N/A	No earthworks taking place on site
Construction	Less than 20m	Small	Medium	Medium	Negligible	<p>1. Construction of worksite and vehicle access ramp to viaduct - building volume assumed to be less than 20,000m<sup>3</sup></p> <p>Construction materials with a low potential for dust release</p> <p>2. Fewer than 10 receptors within 20m of the site</p>
Trackout	Less than 20m	Small	Medium	High	Negligible	<p>1. Fewer than 25 heavy goods vehicles (HGVs) per day</p> <p>2. Between 10 and 100 receptors within 20m of the trackout route</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft Code of Construction Practice <sup>24</sup> mitigation measures)	Principal justifications
<b>St Pancras Way to Morrisons access road (Map AQ-02-002-01, Figure 2.3 and Map AQ-02-002-02, Figure 2.4 (Volume 5, Air Quality Map Book))</b>						
Demolition	Less than 20m	Medium	High	Very high	Slight adverse	1. Waste demolition materials likely to have potential for dust release (e.g. brick, concrete)  2. Densely populated area with more than 100 dwellings within 20m of site
Earthworks	N/A	N/A	N/A	N/A	N/A	No earthworks taking place on site
Construction	Less than 20m	Medium	High	Very high	Slight adverse	1. Piling on site  Potentially dusty construction materials  2. Densely populated area with more than 100 dwellings within 20m of site
Trackout	Less than 20m	Small	Medium	Very high	Slight adverse	1. Fewer than 25 HGVs per day  2. Densely populated area with more than 100 dwellings within 20m of site
<b>Juniper Crescent to Hs1-HS2 Link tunnel portal (Map AQ-02-002-02 Figure 2.5 (Volume 5, Air Quality Map Book))</b>						
Demolition	Less than 20m	Medium	High	Very high	Slight adverse	1. Waste demolition materials likely to have potential for dust release (e.g. brick, concrete)  Assumed that total building volume less than 50,000m <sup>3</sup>  2. Densely populated area with

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft Code of Construction Practice <sup>24</sup> mitigation measures)	Principal justifications
						more than 100 dwellings within 20m of site
Earthworks	Less than 20m	Medium	High	Very high	Slight adverse	1. Creation of access road on site  Site area between 2,500m <sup>2</sup> - 10,000m <sup>2</sup>  2. Densely populated area with more than 100 dwellings within 20m of site
Construction	Less than 20m	Medium	High	Very high	Slight adverse	Potentially dusty construction materials  Total building volume less than 100,000m <sup>3</sup>  2. Densely populated area with fewer than 100 dwellings within 20m of site
Trackout	Less than 20m	Medium	Medium	Very high	Slight adverse	1. 25-100 HGVs per day  2. Densely populated area with more than 100 dwellings within 20m of site
<b>North London Line SBI and Copenhagen Junction SBI (Map AQ-02-002-01 Figure 2.2 and Figure 2.3 (Volume 5, Air Quality Map Book))</b>						
Demolition	N/A	N/A	N/A	N/A	N/A	No demolitions nearby
Earthworks	N/A	N/A	N/A	N/A	N/A	No earthworks nearby

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft Code of Construction Practice <sup>24</sup> mitigation measures)	Principal justifications
Construction	20-40m	Small	Negligible	Medium	Negligible	1. Track-laying near to the sites, construction materials with a low potential for dust release  2. Locally designated ecological sites
Trackout	N/A	N/A	N/A	N/A	N/A	No trackout nearby
<b>London Canals SMI (Map AQ-02-002-02 Figure 2.4 and Figure 2.5 (Volume 5, Air Quality Map Book))</b>						
Demolition	20-40m	Medium	Low	Medium	Negligible	1. Less than 20,000m <sup>3</sup> waste generated during demolition at nearest site  Material with a high dust potential (concrete)  2. Locally designated ecological site
Earthworks	N/A	N/A	N/A	N/A	N/A	No earthworks nearby
Construction	20-40m	Small	Negligible	Medium	Negligible	1. Track-laying near to the canal, construction materials with a low potential for dust release  2. Locally designated ecological site
Trackout	N/A	N/A	N/A	N/A	N/A	No trackout nearby



Table 6: Summary of construction dust impacts and effects

Location	Magnitude of impact	Effect of dust-generating activities	Additional mitigation
Euston Station tunnel portal	Negligible	Not significant	None required
Camley Street main worksite	Negligible	Not significant	None required
St Pancras Way to Morrisons access road	Slight adverse	Not significant	None required
Juniper Crescent to HS1-HS2 Link tunnel portal	Slight adverse	Not significant	None required
North London Line SBI and Copenhagen Junction SBI	Negligible	Not significant	None required
London Canals SMI	Negligible	Not significant	None required

## 5 Air quality assessment - road traffic

### 5.1 Overall assessment approach

- 5.1.1 The air quality assessment for road related emissions has considered the use of three different approaches based on the scale of changes in traffic and road alignment. Where the DMRB<sup>25</sup> thresholds detailed in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) will not be exceeded, an additional assessment is not required as the air quality impacts will be minimal. If these thresholds are breached then a quantitative assessment has been carried out.
- 5.1.2 Where the road configuration is straightforward, the DMRB screening method has been used to predict changes in air quality. Where the road layout is considered to be complex or where the use of the DMRB screening method has indicated that there will be a potential exceedance of air quality standards, the atmospheric dispersion model ADMS-Roads has been used for the assessment. Professional judgment has been used to select the appropriate tool for each area.
- 5.1.3 In this study area both the DMRB screening method and the ADMS-Roads model were used for the assessment.

#### Assessing congestion

- 5.1.4 To assess the impact of congestion on the DMRB assessment, an additional DMRB assessment was carried out that modelled congested situations. This assumed a speed of 10kph in all scenarios for all links where speed exceeded 10kph, in order to identify locations where queuing traffic might give rise to higher concentrations and require further assessment. The results of this additional assessment are presented alongside the main results.
- 5.1.5 For the ADMS-Roads modelling, queues were assumed to occur on roads with an average speed of less than 50% of the speed limit. Queue speeds of 5kph were assumed. A queue length of 25-50m was assumed, depending on the speed on the road<sup>26</sup>. In the absence of information on the occurrence of queuing, it was assumed that queuing occurred between 7am and 7pm.

### 5.2 Model inputs and verification

#### Model parameters for detailed assessment

- 5.2.1 ADMS-Roads model was used for the detailed assessment. A surface roughness length of 1.5m, surface roughness at meteorological site of 0.2m, minimum Monin Obukhov length of 100m and latitude of 51.5 degrees were used in the detailed assessment. All other model parameters were model default settings. Meteorological data from the London Heathrow monitoring site were used.

<sup>25</sup> Highways Agency, (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*

<sup>26</sup> Queue length (in metres) was calculated using the following formula:  $l = 50 - ((v/0.5v_l) \times 25)$ , where  $l$  = queue length,  $v$  = road speed,  $v_l$  = speed limit

## Model verification

- 5.2.2 Since the model predicts nitrogen oxide (NO<sub>x</sub>) contributions for the modelled roads, this was initially compared to the NO<sub>x</sub> road contribution derived from NO<sub>x</sub> concentrations (where available) measured at monitoring sites and Defra background maps.
- 5.2.3 Roadside monitoring sites were chosen from across the traffic model area, which extends both west and south of the study area. This allowed a greater number of sites to be included in the verification. Sites where nearby busy roads were not included in the traffic model data set (and which, therefore, could not be modelled correctly as roadside sites with the traffic data set) were excluded from assessment. The results of this comparison are shown in Table 7.

Table 7: Comparison of monitored and modelled NO<sub>x</sub> concentrations for verification

Site	Monitored total NO <sub>2</sub>	Monitored total NO <sub>x</sub>	Background NO <sub>2</sub>	Background NO <sub>x</sub>	Monitored road NO <sub>x</sub>	Modelled road NO <sub>x</sub>	Monitored/modelled road NO <sub>x</sub>
Camden Euston Road (AURN site)	106.1	350.0	51.0	102.3	247.6	83.2	3.0
Camden Shaftesbury Avenue (AURN site)	71.2	163.0	56.4	116.4	46.6	23.8	2.0
Westminster Marylebone Road (AURN site)	93.6	312.8	43.0	82.1	230.7	80.5	2.8
Camden 19 Kentish Town Road (Diffusion Tube)	59.0	-	34.7	61.7	46.9	20.5	2.3
Camden 26 Camden Road (Diffusion Tube)	67.0	-	38.7	71.5	60.2	43.1	1.4

- 5.2.4 The calculated model adjustment factor for the road contribution of NO<sub>x</sub> was 2.3. This was applied to all NO<sub>x</sub> results from the ADMS-Roads modelling. This is line with Defra guidance<sup>27</sup> on model verification.
- 5.2.5 A final check was then made to compare the total NO<sub>2</sub> concentrations from the modelling to the monitored data. This is shown in Table 8.

<sup>27</sup> Department for Environment, Food and Rural Affairs (2009) *Technical Guidance Note LAQM TG(09)*

Table 8: Comparison of monitored and modelled annual average NO<sub>2</sub> concentrations

Site	Monitored concentration (µg/m <sup>3</sup> )	Modelled concentration (µg/m <sup>3</sup> )	Difference [(modelled - monitored)/monitored] x 100
Camden Euston Road (AURN site)	106.1	111.7	5.4%
Camden Shaftesbury Avenue (AURN site)	71.2	81.1	13.8%
Westminster Marylebone Road (AURN site)	93.6	103.8	10.8%
Camden 19 Kentish Town Road (Diffusion Tube)	59.0	59.0	0.1%
Camden 26 Camden Road (Diffusion Tube)	67.0	78.3	16.8%

5.2.6 As all modelled NO<sub>2</sub> concentrations were within 25% of the monitored concentrations, no further adjustment was undertaken.

## 5.3 Construction traffic model

5.3.1 Construction traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. Scenarios assessed correspond to three peak phases of construction:

- test 1, representing 2017;
- test 2, representing 2019; and
- test 3, representing 2021.

### Receptors assessed

5.3.2 For all road links where DMRB criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads including closest to junctions or to the road itself.

5.3.3 All receptors where DMRB screening identified a likely moderate adverse or significant adverse impact were also modelled within ADMS-Roads. Additional receptors close to DMRB receptors were added in order to ensure that worst-case exposure locations were captured.

5.3.4 Receptors assessed using the DMRB screening methodology and detailed ADMS-Roads modelling are listed in Table 9 and shown in Map AQ-001-02 (Volume 5, Air Quality Map Book).

Table 9: Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey coordinates	Scenarios assessed with the Proposed Scheme	
			DMRB assessment	ADMS-Roads assessment
2-1	166, Camden High Street	528932, 183878	Test 1, test 2	Test 1, test 2
2-2	Camden Road Underground Station, at junction of Bonny Street and Camden Road	529179, 184184	Test 1, test 2, test 3	-
2-3	Property on Royal College Street	529165, 184221	Test 1, test 2	-
2-4	Property at junction of Hampstead Lane and Bishopswood Road	527655, 187616	Test 2	-
2-5	Property at junction of Parkway and Arlington Road	528805, 183810	Test 2	-
2-6	Property at junction of Hillmarton Road and Caledonian Road	530568, 185167	Test 3	-
2-7	Property at junction of Agar Grove and St Pancras Way	529391, 184213	Test 2	-
2-8	10, Chalk Farm Road	528682, 184183	Test 2	Test 2
2-9	187, Camden High Street	528905, 183846	Test 2, test 3	Test 2, test 3
2-10	Property at junction of Highgate High Street and Southwood Lane	528377, 187432	Test 2	-
2-11	Property at junction of Camden Road and Royal College Street	529200, 184219	Test 1, test 2	-
2-12	Property at junction of Kentish Town Road and Prince of Wales Road	528936, 184713	Test 2	-
2-13	Property at junction of Highgate Hill and Cromwell Avenue	528849, 187245	Test 2	-
2-14	51, Kentish Town Road	528940, 184220	Test 2	Test 2
2-15	Property at junction of North Road and Hampstead Lane (near roundabout)	528284, 187491	Test 2	-
2-16	Property at junction of York Way and Copenhagen Street	530325, 183683	Test 1, test 2, test 3	-
2-17	Property at junction of Prince of Wales Road and Castlehaven Road	528788, 184704	Test 2	-
2-18	Property at junction of Holloway Road and Hargrave Road	529590, 186712	Test 2	-
2-19	Property at junction of Royal College Street and Kentish Town Road	528982, 184511	Test 2	-
2-20	Property at junction of York Way and Euston Road	530337, 182999	Test 2	-
2-21	4, Greenland Road	528986, 183874	Test 1, test 2	Test 1, test 2
2-22	Property opposite junction of Camden Road and Rochester Place	529296, 184325	Test 1, test 2	-
2-23	Property opposite junction of Camden Road and St	529233, 184280	Test 1, test 2	-

Receptor	Description/location	Ordnance Survey coordinates	Scenarios assessed with the Proposed Scheme	
			DMRB assessment	ADMS-Roads assessment
	Pancras Way			
2-24	Property at junction of Holloway Road and Marlborough Road	529839, 186625	Test 2	-
2-25	Property at junction of Delancey Street and Camden High Street	529001, 183669	Test 3	-
2-26	Property opposite junction of Kentish Town Road and Prince of Wales Road	528956, 184699	Test 2	-
2-27	Hungerford School and Children's Centre, York Way	529960, 184873	Test 3	-
2-28	Property at junction of Highgate High Street and Highgate West Hill, near roundabout	528325, 187437	Test 2	-
2-29	Property at junction of Camden Road and Camden Park Road	529735, 184854	Test 1, test 2	-
2-30	Property at junction of Greenland Road and Camden High Street	528935, 183852	Test 3	-
2-32	Property at junction of Hampstead Lane and Stormont Road	527467, 187592	Test 2	-
2-33	Property at Camden Square	529668, 184606	Test 1, test 2	-
2-34	Property at junction of Caledonian Road and Copenhagen Street	530712, 183675	Test 2	-
2-35	Property at junction of Stucley Place and Buck Street	528872, 184016	Test 2	-
2-36	Property at junction of Castle Road and Kentish Town Road	528954, 184565	Test 2	-
2-37	Property at junction of Holloway Road and Windermere Road	529460, 186785	Test 2	-
2-38	Property at junction of Hillmarton Road and Camden Road	530198, 185472	Test 1, test 2	-
2-39	Property at junction of Camden Street and Camden Road	529091, 184025	Test 1, test 2, test 3	-
2-48	10, Chalk Farm Road	528682, 184184	-	Test 2
2-49	203, Chalk Farm Road	528683, 184156	-	Test 2
2-50	244, Camden High Street	528762, 184101	-	Test 2
2-51	267A, Camden High Street	528777, 184060	-	Test 2
2-52	226A, Camden High Street	528793, 184069	-	Test 2
2-53	265, Camden High Street	528794, 184041	-	Test 2
2-54	224, Camden High Street	528810, 184052	-	Test 2
2-55	221B, Camden High Street	528846, 183952	-	Test 2

Receptor	Description/location	Ordnance Survey coordinates	Scenarios assessed with the Proposed Scheme	
			DMRB assessment	ADMS-Roads assessment
2-56	239, Camden High Street	528827,183986	-	Test 2
2-57	199, Camden High Street	528878,183897	-	Test 1, test 2
2-58	178, Camden High Street	528886,183923	-	Test 1, test 2
2-59	187, Camden High Street	528906,183846	-	Test 2, test 3
2-60	166, Camden High Street	528935,183852	-	Test 3
2-61	166, Camden High Street	528933,183878	-	Test 1, test 2
2-62	163-165, Camden High Street	528931,183794	-	Test 3
2-63	146, Camden High Street	528954,183802	-	Test 3
2-64	4, Greenland Road	528986,183875	-	Test 1, test 2
2-65	149, Bayham Street	528978,183888	-	Test 1, test 2
2-66	4, Camden Road	528961,183915	-	Test 1, test 2
2-67	8A, Camden Road	528974,183929	-	Test 1, test 2
2-68	144, Bayham Street	529001,183885	-	Test 1, test 2
2-69	146, Bayham Street	528993,183898	-	Test 1, test 2
2-70	21, Pratt Street	529100,183725	-	Test 3
2-71	Brehon House 17-19, Pratt Street	529086,183715	-	Test 3
2-72	114, Bayham Street	529042,183818	-	Test 1, test 2
2-73	4, Kentish Town Road	528932,183928	-	Test 1, test 2
2-74	12, Kentish Town Road	528936,183963	-	Test 2
2-75	25, Kentish Town Road	528924,184021	-	Test 2
2-76	2, Kentish Town Road	528949,184109	-	Test 2
2-77	51, Camden Gardens	528950,184148	-	Test 2
2-78	174, Camden Street	528969,184283	-	Test 2
2-79	63, Kentish Town Road	528937,184274	-	Test 2
2-80	67, Kentish Town Road	528944,184302	-	Test 2
2-81	46A, Kentish Town Road	528971,184308	-	Test 2

## Background concentrations

5.3.5 The background concentrations used in the assessment are shown in Table 10 and Table 11 and taken from the Defra maps<sup>18</sup>.

Table 10: Background 2012 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
(2-1) 166, Camden High Street	67.5	37.1	21.0
(2-2) Camden Road Underground Station, at junction of Bonny Street and Camden Road	71.5	38.7	21.8
(2-3) Property on Royal College Street	71.5	38.7	21.8
(2-4) Property at junction of Hampstead Lane and Bishopswood Road	41.9	25.8	17.4
(2-5) Property at junction of Parkway and Arlington Road	67.5	37.1	21.0
(2-6) Property at junction of Hillmarton Road and Caledonian Road	68.0	37.9	21.9
(2-7) Property at junction of Agar Grove and St Pancras Way	71.5	38.7	21.8
(2-8) 10, Chalk Farm Road	67.2	36.9	20.9
(2-9) 187, Camden High Street	67.5	37.1	21.0
(2-10) Property at junction of Highgate High Street and Southwood Lane	41.9	29.0	18.4
(2-11) Property at junction of Camden Road and Royal College Street	71.5	38.7	21.8
(2-12) Property at junction of Kentish Town Road and Prince of Wales Road	67.2	36.9	20.9
(2-13) Property at junction of Highgate Hill and Cromwell Avenue	51.5	29.0	18.4
(2-14) 51, Kentish Town Road	67.2	36.9	20.9
(2-15) Property at junction of North Road and Hampstead Lane (near roundabout)	41.9	29.0	18.4
(2-16) Property at junction of York Way and Copenhagen Street	79.7	42.3	22.6
(2-17) Property at junction of Prince of Wales Road and Castlehaven Road	67.2	36.9	20.9
(2-18) Property at junction of Holloway Road and Hargrave Road	59.4	33.8	20.6
(2-19) Property at junction of Royal College Street and Kentish Town Road	67.2	36.9	20.9
(2-20) Property at junction of York Way and Euston Road	94.7	48.6	23.3
(2-21) 4, Greenland Road	67.5	37.1	21.0
(2-22) Property opposite junction of Camden Road and Rochester Place	71.5	38.7	21.8



Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
(2-23) Property opposite junction of Camden Road and St Pancras Way	71.5	38.7	21.8
(2-24) Property at junction of Holloway Road and Marlborough Road	59.4	33.8	20.6
(2-25) Property at junction of Delancey Street and Camden High Street	76.7	40.7	22.2
(2-26) Property opposite junction of Kentish Town Road and Prince of Wales Road	67.2	36.9	20.9
(2-27) Hungerford School and Children's Centre, York Way	71.5	38.7	21.8
(2-28) Property at junction of Highgate High Street and Highgate West Hill, near roundabout	41.9	29.0	18.4
(2-29) Property at junction of Camden Road and Camden Park Road	71.5	38.7	21.8
(2-30) Property at junction of Greenland Road and Camden High Street	67.5	37.1	21.0
(2-33) Property at Camden Square	41.9	25.8	17.4
(2-34) Property at junction of Caledonian Road and Copenhagen Street	71.5	38.7	21.8
(2-35) Property at junction of Stucley Place and Buck Street	79.7	42.3	22.6
(2-36) Property at junction of Castle Road and Kentish Town Road	67.2	36.9	20.9
(2-37) Property at junction of Holloway Road and Windermere Road	67.2	36.9	20.9
(2-38) Property at junction of Hillmarton Road and Camden Road	59.4	33.8	20.6
(2-39) Property at junction of Camden Street and Camden Road	68.0	37.9	21.9
(2-48) 10, Chalk Farm Road	71.5	38.7	21.8
(2-49) 203, Chalk Farm Road	67.2	36.9	20.9
(2-50) 244, Camden High Street	67.2	36.9	20.9
(2-51) 267A, Camden High Street	67.2	36.9	20.9
(2-52) 226A, Camden High Street	67.2	36.9	20.9
(2-53) 265, Camden High Street	67.2	36.9	20.9
(2-54) 224, Camden High Street	67.2	36.9	20.9
(2-55) 221B, Camden High Street	67.2	36.9	20.9
(2-56) 239, Camden High Street	67.5	37.1	21.0

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
(2-57) 199, Camden High Street	67.5	37.1	21.0
(2-58) 178, Camden High Street	67.5	37.1	21.0
(2-59) 187, Camden High Street	67.5	37.1	21.0
(2-60) 166, Camden High Street	67.5	37.1	21.0
(2-61) 166, Camden High Street	67.5	37.1	21.0
(2-62) 163-165, Camden High Street	67.5	37.1	21.0
(2-63) 146, Camden High Street	67.5	37.1	21.0
(2-64) 4, Greenland Road	67.5	37.1	21.0
(2-65) 149, Bayham Street	67.5	37.1	21.0
(2-66) 4, Camden Road	67.5	37.1	21.0
(2-67) 8A, Camden Road	67.5	37.1	21.0
(2-68) 144, Bayham Street	67.5	37.1	21.0
(2-69) 146, Bayham Street	76.7	40.7	22.2
(2-70) 21, Pratt Street	67.5	37.1	21.0
(2-71) Brehon House 17-19, Pratt Street	76.7	40.7	22.2
(2-72) 114, Bayham Street	76.7	40.7	22.2
(2-73) 4, Kentish Town Road	76.7	40.7	22.2
(2-74) 12, Kentish Town Road	67.5	37.1	21.0
(2-75) 25, Kentish Town Road	67.5	37.1	21.0
(2-76) 2, Kentish Town Road	67.2	36.9	20.9
(2-77) 51, Camden Gardens	67.2	36.9	20.9
(2-78) 174, Camden Street	67.2	36.9	20.9
(2-79) 63, Kentish Town Road	67.2	36.9	20.9
(2-80) 67, Kentish Town Road	67.2	36.9	20.9
(2-81) 46A, Kentish Town Road	67.2	36.9	20.9

Table 11: Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
(2-1) 166, Camden High Street	54.3	31.3	19.8
(2-2) Camden Road Underground Station, at junction of Bonny Street and Camden Road	51.9	30.2	20.4
(2-3) Property on Royal College Street	51.9	30.2	20.4
(2-4) Property at junction of Hampstead Lane	32.0	20.6	16.4

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
and Bishopswood Road			
(2-5) Property at junction of Parkway and Arlington Road	48.7	28.8	19.7
(2-6) Property at junction of Hillmarton Road and Caledonian Road	43.7	26.8	20.5
(2-7) Property at junction of Agar Grove and St Pancras Way	49.5	29.1	20.4
(2-8) 10, Chalk Farm Road	54.6	31.4	19.7
(2-9) 187, Camden High Street	54.3	31.3	19.8
(2-10) Property at junction of Highgate High Street and Southwood Lane	35.3	22.4	17.3
(2-11) Property at junction of Camden Road and Royal College Street	51.9	30.2	20.4
(2-12) Property at junction of Kentish Town Road and Prince of Wales Road	48.3	28.5	19.6
(2-13) Property at junction of Highgate Hill and Cromwell Avenue	35.3	22.4	17.3
(2-14) 51, Kentish Town Road	54.6	31.4	19.7
(2-15) Property at junction of North Road and Hampstead Lane (near roundabout)	35.3	22.4	17.3
(2-16) Property at junction of York Way and Copenhagen Street	57.5	33.0	21.1
(2-17) Property at junction of Prince of Wales Road and Castlehaven Road	52.1	30.3	19.6
(2-18) Property at junction of Holloway Road and Hargrave Road	42.1	25.7	19.4
(2-19) Property at junction of Royal College Street and Kentish Town Road	50.9	29.7	19.6
(2-20) Property at junction of York Way and Euston Road	67.1	37.1	21.7
(2-21) 4, Greenland Road	54.3	31.3	19.8
(2-22) Property opposite junction of Camden Road and Rochester Place	51.9	30.2	20.4
(2-23) Property opposite junction of Camden Road and St Pancras Way	51.9	30.2	20.4
(2-24) Property at junction of Holloway Road and Marlborough Road	44.4	26.9	19.4
(2-25) Property at junction of Delancey Street and Camden High Street	55.4	31.7	20.9
(2-26) Property opposite junction of Kentish	48.3	28.5	19.6

Receptor (or zone of receptors)	Concentrations (µg/m <sup>3</sup> )		
	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>
Town Road and Prince of Wales Road			
(2-27) Hungerford School and Children's Centre, York Way	49.5	29.1	20.4
(2-28) Property at junction of Highgate High Street and Highgate West Hill, near roundabout	35.3	22.4	17.3
(2-29) Property at junction of Camden Road and Camden Park Road	51.9	30.2	20.4
(2-30) Property at junction of Greenland Road and Camden High Street	50.5	29.6	19.7
(2-34) Property at junction of Caledonian Road and Copenhagen Street	32.0	20.6	16.4
(2-35) Property at junction of Stucley Place and Buck Street	51.9	30.2	20.4
(2-36) Property at junction of Castle Road and Kentish Town Road	55.3	32.0	21.1
(2-37) Property at junction of Holloway Road and Windermere Road	50.9	29.7	19.6
(2-38) Property at junction of Hillmarton Road and Camden Road	48.3	28.5	19.6
(2-39) Property at junction of Camden Street and Camden Road	42.1	25.7	19.4
(2-48) 10, Chalk Farm Road	54.6	31.4	19.7
(2-49) 203, Chalk Farm Road	54.6	31.4	19.7
(2-50) 244, Camden High Street	54.6	31.4	19.7
(2-51) 267A, Camden High Street	54.6	31.4	19.7
(2-52) 226A, Camden High Street	54.6	31.4	19.7
(2-53) 265, Camden High Street	54.6	31.4	19.7
(2-54) 224, Camden High Street	54.6	31.4	19.7
(2-55) 221B, Camden High Street	54.3	31.3	19.8
(2-56) 239, Camden High Street	54.3	31.3	19.8
(2-57) 199, Camden High Street	54.3	31.3	19.8
(2-58) 178, Camden High Street	54.3	31.3	19.8
(2-59) 187, Camden High Street	54.3	31.3	19.8
(2-60) 166, Camden High Street	54.3	31.3	19.8
(2-61) 166, Camden High Street	54.3	31.3	19.8
(2-62) 163-165, Camden High Street	54.3	31.3	19.8

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>
(2-63) 146, Camden High Street	54.3	31.3	19.8
(2-64) 4, Greenland Road	54.3	31.3	19.8
(2-65) 149, Bayham Street	54.3	31.3	19.8
(2-66) 4, Camden Road	54.3	31.3	19.8
(2-67) 8A, Camden Road	54.3	31.3	19.8
(2-68) 144, Bayham Street	61.6	34.4	20.9
(2-69) 146, Bayham Street	54.3	31.3	19.8
(2-70) 21, Pratt Street	61.6	34.4	20.9
(2-71) Brehon House 17-19, Pratt Street	61.6	34.4	20.9
(2-72) 114, Bayham Street	61.6	34.4	20.9
(2-73) 4, Kentish Town Road	54.3	31.3	19.8
(2-74) 12, Kentish Town Road	54.3	31.3	19.8
(2-75) 25, Kentish Town Road	54.6	31.4	19.7
(2-76) 2, Kentish Town Road	54.6	31.4	19.7
(2-77) 51, Camden Gardens	54.6	31.4	19.7
(2-78) 174, Camden Street	54.6	31.4	19.7
(2-79) 63, Kentish Town Road	54.6	31.4	19.7
(2-80) 67, Kentish Town Road	54.6	31.4	19.7
(2-81) 46A, Kentish Town Road	54.6	31.4	19.7
(2-80) 67, Kentish Town Road	54.6	31.4	19.7
(2-81) 46A, Kentish Town Road	54.6	31.4	19.7

## Design Manual for Roads and Bridges model results

5.3.6 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the Environmental Protection UK (EPUK) methodology<sup>28</sup>.

Table 12: Summary of DMRB annual mean NO<sub>2</sub> results (construction phase)

Receptor	NO <sub>2</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme <sup>29</sup>			
2-1	47.0	41.3	48.3	7.0	Large	Substantial adverse
2-2	61.3	52.7	53.8	1.2	Small	Slight adverse
2-3	50.4	43.4	44.1	0.8	Small	Slight adverse
2-4	27.3	23.8	24.2	0.4	Small	Negligible
2-5	46.6	40.1	41.9	1.8	Small	Slight adverse
2-6	35.7	29.7	29.8	0.1	Imperceptible	Negligible
2-7	40.2	34.2	34.2	-0.1	Imperceptible	Negligible
2-8	68.3	52.4	56.8	4.4	Large	Substantial adverse
2-9	65.5	56.4	59.0	2.6	Medium	Moderate adverse
2-10	50.3	41.9	42.9	1.0	Small	Slight adverse
2-11	63.0	54.6	54.5	-0.1	Imperceptible	Negligible
2-12	55.5	47.5	47.6	0.1	Imperceptible	Negligible
2-13	40.2	33.1	33.8	0.7	Small	Negligible
2-14	53.7	46.0	50.1	4.1	Large	Substantial adverse

<sup>28</sup> Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality*

<sup>29</sup> Concentrations presented represent the highest of the three test scenarios

Receptor	NO <sub>2</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme <sup>29</sup>			
2-15	36.4	30.2	30.9	0.8	Small	Negligible
2-16	62.6	53.2	54.3	1.1	Small	Slight adverse
2-17	48.9	42.2	42.9	0.7	Small	Slight adverse
2-18	44.1	35.7	36.0	0.4	Imperceptible	Negligible
2-19	56.1	46.7	46.5	-0.2	Imperceptible	Negligible
2-20	83.6	70.5	71.0	0.5	Small	Slight adverse
2-21	42.0	34.3	40.9	6.6	Large	Substantial adverse
2-22	54.5	46.0	45.7	-0.3	Imperceptible	Negligible
2-23	61.9	52.7	52.2	-0.5	Small	Slight beneficial
2-24	39.9	41.7	42.0	0.3	Imperceptible	Negligible
2-25	63.2	51.5	52.7	1.1	Small	Slight adverse
2-26	60.9	51.0	50.7	-0.3	Imperceptible	Negligible
2-27	36.5	31.0	31.2	0.2	Imperceptible	Negligible
2-28	49.0	40.6	41.1	0.5	Small	Slight adverse
2-29	52.5	44.2	44.0	-0.3	Imperceptible	Negligible
2-30	67.6	55.1	56.8	1.7	Small	Slight adverse
2-31	31.2	25.6	26.4	0.7	Small	Negligible
2-32	36.7	31.3	31.3	0.0	Imperceptible	Negligible
2-33	56.0	47.9	48.4	0.5	Small	Slight adverse
2-34	40.1	34.3	34.3	-0.1	Imperceptible	Negligible

Receptor	NO <sub>2</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme <sup>29</sup>			
2-35	55.8	48.1	48.0	-0.1	Imperceptible	Negligible
2-36	55.2	45.3	46.2	0.9	Small	Slight adverse
2-37	45.6	45.2	45.0	-0.3	Imperceptible	Negligible
2-38	68.6	57.8	57.1	-0.7	Small	Slight beneficial

Table 13: Summary of DMRB annual mean PM<sub>10</sub> results (construction phase)

Receptor	PM <sub>10</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-1	22.2	21.1	21.1	0.0	Imperceptible	Negligible
2-2	25.2	23.8	23.6	-0.1	Imperceptible	Negligible
2-3	23.6	22.4	22.3	0.0	Imperceptible	Negligible
2-4	17.6	16.9	16.9	0.0	Imperceptible	Negligible
2-5	22.5	21.3	21.3	0.1	Imperceptible	Negligible
2-6	22.1	21.0	21.0	0.0	Imperceptible	Negligible
2-7	22.3	21.2	21.1	0.0	Imperceptible	Negligible
2-8	25.6	23.3	23.3	0.0	Imperceptible	Negligible
2-9	24.5	23.0	22.9	-0.1	Imperceptible	Negligible
2-10	21.6	19.9	19.9	0.0	Imperceptible	Negligible
2-11	25.5	24.1	24.0	-0.1	Imperceptible	Negligible



Receptor	PM <sub>10</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-12	23.6	22.2	22.2	0.0	Imperceptible	Negligible
2-13	20.2	19.1	19.1	0.0	Imperceptible	Negligible
2-14	23.1	21.8	21.8	0.0	Imperceptible	Negligible
2-15	19.9	18.8	18.8	0.0	Imperceptible	Negligible
2-16	26.0	24.4	24.6	0.2	Imperceptible	Negligible
2-17	22.6	21.4	21.5	0.0	Imperceptible	Negligible
2-18	22.8	21.6	21.6	0.0	Imperceptible	Negligible
2-19	23.9	22.3	22.3	0.0	Imperceptible	Negligible
2-20	29.7	26.5	26.7	0.1	Imperceptible	Negligible
2-21	21.6	20.3	20.4	0.1	Imperceptible	Negligible
2-22	24.6	23.2	23.1	-0.1	Imperceptible	Negligible
2-23	25.3	23.7	23.6	-0.1	Imperceptible	Negligible
2-24	21.7	22.7	22.7	0.0	Imperceptible	Negligible
2-25	25.2	23.4	23.4	0.0	Imperceptible	Negligible
2-26	24.1	22.5	22.5	0.0	Imperceptible	Negligible
2-27	21.7	20.6	20.6	0.0	Imperceptible	Negligible
2-28	21.8	20.4	20.4	0.0	Imperceptible	Negligible
2-29	23.9	22.6	22.5	-0.1	Imperceptible	Negligible
2-30	24.3	22.6	22.3	-0.3	Imperceptible	Negligible
2-31	18.4	17.4	17.4	0.0	Imperceptible	Negligible

Receptor	PM <sub>10</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-32	21.7	20.6	20.6	0.0	Imperceptible	Negligible
2-33	24.7	23.3	23.4	0.0	Imperceptible	Negligible
2-34	21.2	20.0	20.0	0.0	Imperceptible	Negligible
2-35	23.5	22.3	22.2	0.0	Imperceptible	Negligible
2-36	24.3	22.9	22.9	0.0	Imperceptible	Negligible
2-37	23.5	23.9	23.9	-0.1	Imperceptible	Negligible
2-38	26.7	25.1	25.0	-0.1	Imperceptible	Negligible

5.3.7 No further receptors were identified from the additional DMRB congestion assessment as moderate or substantial adverse.

### Detailed modelling results

5.3.8 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the EPUK methodology<sup>28</sup>. Results presented correspond to the greatest impact at each receptor from the construction traffic scenarios assessed.

Table 14: Summary of ADMS-Roads annual mean NO<sub>2</sub> results (construction phase)

Receptor	Concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-1	78.7	67.4	67.2	-0.2	Imperceptible	Negligible
2-8	74.1	56.6	57.6	0.9	Small	Slight adverse
2-9	71.3	61.0	61.0	0.0	Imperceptible	Negligible
2-14	61.0	51.2	51.0	-0.2	Imperceptible	Negligible

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-21	68.2	56.5	57.8	1.4	Small	Slight adverse
2-49	72.7	55.7	56.5	0.8	Small	Slight adverse
2-50	62.3	48.2	48.5	0.3	Imperceptible	Negligible
2-51	65.7	49.8	49.9	0.0	Imperceptible	Negligible
2-52	63.9	48.6	48.6	0.0	Imperceptible	Negligible
2-53	67.5	51.3	51.3	0.0	Imperceptible	Negligible
2-54	59.1	46.4	46.3	0.0	Imperceptible	Negligible
2-55	59.5	47.2	47.2	0.0	Imperceptible	Negligible
2-56	53.5	43.9	43.9	-0.1	Imperceptible	Negligible
2-57	53.2	43.4	43.4	0.0	Imperceptible	Negligible
2-58	56.9	47.3	47.2	-0.1	Imperceptible	Negligible
2-59	58.9	48.6	48.5	-0.1	Imperceptible	Negligible
2-60	72.8	62.2	62.1	-0.1	Imperceptible	Negligible
2-61	72.6	60.7	60.8	0.1	Imperceptible	Negligible
2-62	76.5	65.2	65.3	0.1	Imperceptible	Negligible
2-63	63.4	52.2	52.0	-0.3	Imperceptible	Negligible
2-64	71.8	59.0	58.6	-0.4	Imperceptible	Negligible
2-65	69.1	57.2	58.7	1.5	Small	Slight adverse
2-66	69.6	57.9	58.8	0.8	Small	Slight adverse
2-67	72.9	61.7	61.1	-0.5	Small	Slight beneficial

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-68	83.8	70.9	70.4	-0.5	Small	Slight beneficial
2-69	74.7	62.3	62.9	0.7	Small	Slight adverse
2-70	71.9	60.0	60.0	0.0	Imperceptible	Negligible
2-71	76.3	63.1	63.8	0.7	Small	Slight adverse
2-72	72.8	60.1	60.6	0.5	Small	Slight adverse
2-73	72.8	60.4	61.0	0.7	Small	Slight adverse
2-74	70.0	61.1	60.5	-0.6	Small	Slight beneficial
2-75	65.7	57.4	56.9	-0.4	Small	Slight beneficial
2-76	57.6	49.4	49.1	-0.2	Imperceptible	Negligible
2-77	63.0	53.4	53.1	-0.3	Imperceptible	Negligible
2-78	65.6	55.4	55.1	-0.3	Imperceptible	Negligible
2-79	71.7	59.8	59.6	-0.2	Imperceptible	Negligible
2-80	69.7	57.9	57.9	0.0	Imperceptible	Negligible
2-81	69.8	57.7	57.5	-0.2	Imperceptible	Negligible
2-82	64.7	53.5	53.3	-0.2	Imperceptible	Negligible

Table 15: Summary of ADMS-Roads annual mean PM<sub>10</sub> results (construction phase)

Receptor	Concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-1	26.0	24.3	24.2	-0.1	Imperceptible	Negligible
2-8	25.4	22.8	23.0	0.1	Imperceptible	Negligible
2-9	24.6	23.0	23.0	0.0	Imperceptible	Negligible
2-14	23.3	21.7	21.7	0.0	Imperceptible	Negligible
2-21	24.3	22.8	23.0	0.2	Imperceptible	Negligible
2-49	25.1	22.7	22.8	0.1	Imperceptible	Negligible
2-50	23.5	21.2	21.3	0.0	Imperceptible	Negligible
2-51	24.1	21.2	21.2	0.0	Imperceptible	Negligible
2-52	23.9	21.2	21.1	0.0	Imperceptible	Negligible
2-53	24.4	21.4	21.4	0.0	Imperceptible	Negligible
2-54	22.9	20.8	20.8	0.0	Imperceptible	Negligible
2-55	22.8	20.8	20.8	0.0	Imperceptible	Negligible
2-56	22.0	20.6	20.6	0.0	Imperceptible	Negligible
2-57	22.0	20.5	20.5	0.0	Imperceptible	Negligible
2-58	22.5	21.1	21.0	0.0	Imperceptible	Negligible
2-59	22.6	21.1	21.1	0.0	Imperceptible	Negligible
2-60	24.7	23.2	23.2	0.0	Imperceptible	Negligible
2-61	24.6	23.0	23.0	0.0	Imperceptible	Negligible

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-62	25.6	24.0	23.9	-0.1	Imperceptible	Negligible
2-63	23.2	21.7	21.6	-0.1	Imperceptible	Negligible
2-64	24.3	22.6	22.5	-0.1	Imperceptible	Negligible
2-65	24.5	22.9	23.1	0.2	Imperceptible	Negligible
2-66	24.5	23.0	23.1	0.1	Imperceptible	Negligible
2-67	25.1	23.6	23.5	-0.1	Imperceptible	Negligible
2-68	27.1	25.5	25.3	-0.1	Imperceptible	Negligible
2-69	26.1	24.5	24.6	0.1	Imperceptible	Negligible
2-70	24.9	23.4	23.3	0.0	Imperceptible	Negligible
2-71	26.3	24.6	24.7	0.1	Imperceptible	Negligible
2-72	25.8	23.9	24.0	0.1	Imperceptible	Negligible
2-73	25.8	24.2	24.3	0.1	Imperceptible	Negligible
2-74	24.5	23.1	23.0	-0.1	Imperceptible	Negligible
2-75	23.8	22.4	22.4	-0.1	Imperceptible	Negligible
2-76	22.5	21.2	21.2	0.0	Imperceptible	Negligible
2-77	23.6	22.2	22.1	-0.1	Imperceptible	Negligible
2-78	24.2	22.7	22.6	-0.1	Imperceptible	Negligible
2-79	25.1	23.3	23.3	0.0	Imperceptible	Negligible
2-80	24.6	22.7	22.7	0.0	Imperceptible	Negligible
2-81	24.7	22.9	22.8	0.0	Imperceptible	Negligible

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-82	23.9	22.3	22.2	0.0	Imperceptible	Negligible

Table 16: Summary of ADMS-Roads 24-hour mean PM<sub>10</sub> results (construction phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-1	14.8	10.9	10.6	-0.3	Imperceptible	Negligible
2-8	13.3	7.7	8.0	0.3	Imperceptible	Negligible
2-9	11.4	8.2	8.1	0.0	Imperceptible	Negligible
2-14	8.6	5.9	5.8	0.0	Imperceptible	Negligible
2-21	10.8	7.7	8.1	0.4	Imperceptible	Negligible
2-49	12.7	7.5	7.7	0.3	Imperceptible	Negligible
2-50	9.0	5.1	5.2	0.1	Imperceptible	Negligible
2-51	10.2	5.0	5.0	0.0	Imperceptible	Negligible
2-52	10.0	5.0	4.9	0.0	Imperceptible	Negligible
2-53	11.0	5.4	5.3	0.0	Imperceptible	Negligible
2-54	7.9	4.5	4.4	0.0	Imperceptible	Negligible
2-55	7.7	4.5	4.5	0.0	Imperceptible	Negligible
2-56	6.3	4.2	4.1	0.0	Imperceptible	Negligible
2-57	6.3	4.1	4.1	0.0	Imperceptible	Negligible
2-58	7.1	4.8	4.8	0.0	Imperceptible	Negligible

Receptor	Concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-59	7.3	4.9	4.9	0.0	Imperceptible	Negligible
2-60	11.8	8.5	8.4	-0.1	Imperceptible	Negligible
2-61	11.5	8.0	8.0	0.0	Imperceptible	Negligible
2-62	13.8	10.1	9.9	-0.1	Imperceptible	Negligible
2-63	8.6	5.8	5.7	-0.1	Imperceptible	Negligible
2-64	10.7	7.3	7.2	-0.2	Imperceptible	Negligible
2-65	11.2	7.9	8.4	0.4	Imperceptible	Negligible
2-66	11.3	8.0	8.2	0.2	Imperceptible	Negligible
2-67	12.7	9.3	9.1	-0.2	Imperceptible	Negligible
2-68	17.9	13.5	13.2	-0.3	Imperceptible	Negligible
2-69	15.2	11.2	11.4	0.2	Imperceptible	Negligible
2-70	12.1	8.8	8.7	-0.1	Imperceptible	Negligible
2-71	15.8	11.4	11.7	0.3	Imperceptible	Negligible
2-72	14.3	10.0	10.2	0.2	Imperceptible	Negligible
2-73	14.4	10.6	10.9	0.3	Imperceptible	Negligible
2-74	11.1	8.3	8.1	-0.2	Imperceptible	Negligible
2-75	9.6	7.1	7.0	-0.1	Imperceptible	Negligible
2-76	7.2	5.1	5.0	0.0	Imperceptible	Negligible
2-77	9.4	6.6	6.5	-0.1	Imperceptible	Negligible
2-78	10.5	7.5	7.4	-0.1	Imperceptible	Negligible



Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
2-79	12.6	8.7	8.6	-0.1	Imperceptible	Negligible
2-80	11.4	7.6	7.6	0.0	Imperceptible	Negligible
2-81	11.8	7.9	7.8	-0.1	Imperceptible	Negligible
2-82	10.0	6.7	6.7	-0.1	Imperceptible	Negligible

## Assessment of significance

- 5.3.9 The significance of the impacts on air quality from construction traffic associated with HS2 has been assessed in line with the EPUK methodology<sup>28</sup>. AQMAs cover the study area and baseline pollution levels exceed air quality standards in many locations, particularly along major roads.
- 5.3.10 The DMRB assessment identified a number of receptors where there may be moderate or substantial air quality impacts from traffic during the construction phase. The detailed ADMS-Roads assessment predicted that impacts in the study area will be slight adverse at worst for NO<sub>2</sub> and negligible for PM<sub>10</sub>. The effect will not be significant.

## 5.4 Operational traffic model

- 5.4.1 Operational traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The scenario assessed is based on maximum traffic on affected roads during the opening year of the Proposed Scheme.

### Receptors assessed

- 5.4.2 For all road links where DMRB criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads including closest to junctions or to the road itself. Receptors assessed are presented in Map AQ-01-002 (Volume 5, Air Quality Map Book).

Table 17: Modelled receptors (operational phase)

Receptor	Description/location	Ordnance Survey coordinates
2-39	Property at junction of New North Road and Essex Road	532150, 184120
2-40	Property at junction of Camden Road and Camden Street	529092, 184026
2-41	Property at junction of Brewery Road and York Way	530064, 184386
2-42	Property at junction of Essex Road and Canonbury Road	532148, 184150
2-43	Property at junction of York Way and Copenhagen Street	530326, 183684
2-44	Property at junction of Upper Street and Liverpool Road	531451, 183308
2-45	Property at junction of Greenland Road and Camden High Street	528934, 183862
2-46	Property at junction of Camden Walk and Islington Green	531653, 183572
2-47	Property at junction of Pentonville Road and Penton Street	531099, 183113

## Background concentrations

- 5.4.3 The background concentrations used in the assessment are shown in Table 18 and Table 19 taken from the Defra maps<sup>18</sup>.

Table 18: Background 2012 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
(2-39) Property at junction of New North Road and Essex Road	62.8	35.6	21.7
(2-40) Property at junction of Camden Road and Camden Street	63.6	35.3	21.6
(2-41) Property at junction of Brewery Road and York Way	63.3	35.6	21.2
(2-42) Property at junction of Essex Road and Canonbury Road	62.8	35.6	21.7
(2-43) Property at junction of York Way and Copenhagen Street	68.4	37.7	22.3
(2-44) Property at junction of Upper Street and Liverpool Road	67.7	37.4	22.5
(2-45) Property at junction of Greenland Road and Camden High Street	59.8	33.8	20.8
(2-46) Property at junction of Camden Walk and Islington Green	72.9	39.6	22.7
(2-47) Property at junction of Pentonville Road and Penton Street	67.7	37.4	22.5

Table 19: Background 2026 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NOx	NO <sub>2</sub>	PM <sub>10</sub>
(2-39) Property at junction of New North Road and Essex Road	36.7	23.2	19.6
(2-40) Property at junction of Camden Road and Camden Street	39.3	24.1	19.5
(2-41) Property at junction of Brewery Road and York Way	38.7	24.1	19.2
(2-42) Property at junction of Essex Road and Canonbury Road	36.7	23.2	19.6
(2-43) Property at junction of York Way and Copenhagen Street	41.6	25.5	20.2
(2-44) Property at junction of Upper Street and Liverpool Road	41.0	25.2	20.4
(2-45) Property at junction of Greenland Road and Camden High Street	36.5	22.7	18.8
(2-46) Property at junction of Camden Walk and Islington Green	43.8	26.6	20.5
(2-47) Property at junction of Pentonville Road and Penton Street	41.0	25.2	20.4

## Design Manual for Roads and Bridges model results

5.4.4 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the EPUK methodology<sup>28</sup>.

Table 20: Summary of DMRB annual mean NO<sub>2</sub> results (operational phase)

Receptor	NO <sub>2</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2026 without Proposed Scheme	2026 with Proposed Scheme			
2-39	76.1	41.7	42.5	0.7	Small	Slight adverse
2-40	68.8	36.5	36.3	-0.2	Imperceptible	Negligible
2-41	50.1	30.1	30.4	0.3	Imperceptible	Negligible
2-42	72.1	40.1	41.1	1.0	Small	Slight adverse
2-43	59.4	34.6	34.8	0.2	Imperceptible	Negligible
2-44	65.8	36.6	37.1	0.5	Small	Slight adverse
2-45	53.0	28.5	27.9	-0.6	Small	Negligible
2-46	60.8	34.3	34.8	0.6	Small	Negligible
2-47	77.4	40.9	41.4	0.5	Small	Slight adverse

Table 21: Summary of DMRB annual mean PM<sub>10</sub> results (operational phase)

Receptor	PM <sub>10</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2026 without Proposed Scheme	2026 with Proposed Scheme			
2-39	25.6	23.8	23.9	0.1	Imperceptible	Negligible
2-40	24.8	23.6	23.6	-0.1	Imperceptible	Negligible

Receptor	PM <sub>10</sub> concentrations (µg/m <sup>3</sup> )			Change in concentrations (µg/m <sup>3</sup> )	Magnitude of change	Impact descriptor
	2012 baseline	2026 without Proposed Scheme	2026 with Proposed Scheme			
2-41	21.2	20.9	21.0	0.1	Imperceptible	Negligible
2-42	24.3	23.0	23.1	0.1	Imperceptible	Negligible
2-43	23.6	23.0	23.1	0.1	Imperceptible	Negligible
2-44	23.7	23.0	23.1	0.1	Imperceptible	Negligible
2-45	20.8	20.1	20.0	-0.1	Imperceptible	Negligible
2-46	22.9	22.4	22.5	0.1	Imperceptible	Negligible
2-47	26.2	24.7	24.8	0.1	Imperceptible	Negligible

### Assessment of significance

- 5.4.5 The significance of the impacts on air quality from operational traffic associated with the Proposed Scheme has been assessed in line with the EPUK methodology<sup>28</sup>, taking into account the baseline air quality and air quality standards.
- 5.4.6 The DMRB assessment identified that air quality impacts may be negligible, slight adverse or slight beneficial for NO<sub>2</sub> and negligible for PM<sub>10</sub> during the operational phase. The effects of these impacts on receptors will not be significant.

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